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PRINCE WILLIAM SOUND TAGGING RESEARCH, 1983

By:
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April 1984

ALASKA DEPARTMENT OF FISH AND GAME
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Don W. Collinsworth
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ADF&G TECHNICAL DATA REPORTS

This series of reports is designed to facilitate prompt reporting of data from studies conducted by the Alaska Department of Fish and Game, especially studies which may be of direct and immediate interest to scientists of other agencies.

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Data presented in these reports is intended to be final, however, some revisions may occasionally be necessary. Minor revisions will be made via errata sheets. Major revisions will be made in the form of revised reports.

PRINCE WILLIAM SOUND SALMON TAGGING RESEARCH, 1983

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ABSTRACT

In 1983 the fourth, and final, phase of a tag and tag recovery program was conducted by the Alaska Department of Fish and Game on adult Pacific salmon *(Oncorhynchus* sp.*)* in Prince William Sound. The program's short term objective was to determine temporal and spatial relationships of wild and hatchery stocks in the general areas of existing and proposed hatcheries. The long term objective is to provide the Department with a basis for developing management techniques preventing both under and overharvesting of either group of fish.

A total of 8,886 salmon was tagged with labeled and sequentially numbered red Peterson disc tags. Salmon were captured with a purse seine operated from a chartered fishing vessel. Tag recovery was from the commercial fishery and spawning ground surveys; nearly 1,350 tags, 15.2% of the total used were recovered.

Four hatcheries were involved in this study.

KEY WORDS: tag and tag recovery, adult salmon, wild and hatchery stocks, temporal and spatial occurrences, existing and proposed hatcheries.

INTRODUCTION

During the early 1980's, most wild Pacific salmon *(Oncorhynchus* sp.*)* stocks in Prince William Sound (Figure 1) are highly productive; stocks that suffered the depletive effects of the 1964 earthquake are increasing through favorable environmental factors and protective management practices. In conjunction with this upward trend in wild stock production, there is also a successful salmon hatchery program in Prince William Sound. The advent of this hatchery program presents a complex problem to the area fishery manager. It is very difficult to successfully manage for both wild and hatchery returns having similar timing and migration routes, but supporting different exploitation rates. At present, Alaska Department of Fish and Game (ADF&G) policy dictates that "if complexities arise in managing mixed stocks, including both hatchery and wild fish, it will be State policy to manage the collective resources in a manner that favors protection of the wild stocks." (ADF&G 1978). However, in reality, the resource manager must allow the private nonprofit hatchery owners and the common property fishery participants to harvest wild and hatchery returns in a timely manner to: (1) ensure a quality catch, and (2) allow sufficient and timely escapements to wild stock streams and hatcheries.

In order to provide a data base for the obtainment of these objectives it was considered necessary to conduct a tag and tag recovery program in the general areas of existing and proposed hatchery sites. The 1983 program involved four different hatcheries, two public and two private nonprofit facilities. The public hatcheries were Cannery Creek and Main Bay. These facilities are operated by the ADF&G Fisheries Rehabilitation, Enhancement, and Development Division (FRED). The private nonprofit existing or proposed hatcheries are operated or proposed by the following corporations: (1) Solomon Gulch, operated by the Valdez Fisheries Development Association (VFDA); and (2) Esther Island facility, proposed by the Prince William Sound Aquaculture Corporation (PWSAC).

MATERIALS AND METHODS

Salmon for tagging were captured using a purse seine operated from a chartered purse seine vessel. Each fish was tagged with a sequentially numbered 19 mm (3/4 in) diameter Peterson disc tag. Species was recorded along with tagging site and date. Fish for tagging were captured at established commercial fishery sites only. Tagging was conducted 5 days a week, Wednesday through Sunday. With the exception of special openings or closures, the Prince William Sound fishery is conducted Monday through Friday. Tagging on weekends was conducted to increase recoveries from stream surveys and hatchery operations. A total of 8,886 tags was applied.

Tag recoveries were from the commercial fishery, hatcheries, and spawning ground escapement surveys. Fishermen were provided with data recording forms and were alerted to the program through news releases by the local newspaper and radio station. They were requested to return their recovery data at their earliest convenience. The stream tag recovery segment was conducted by two, two-man Commercial Fisheries Division crews who used the State vessel MONTAGUE as a base of

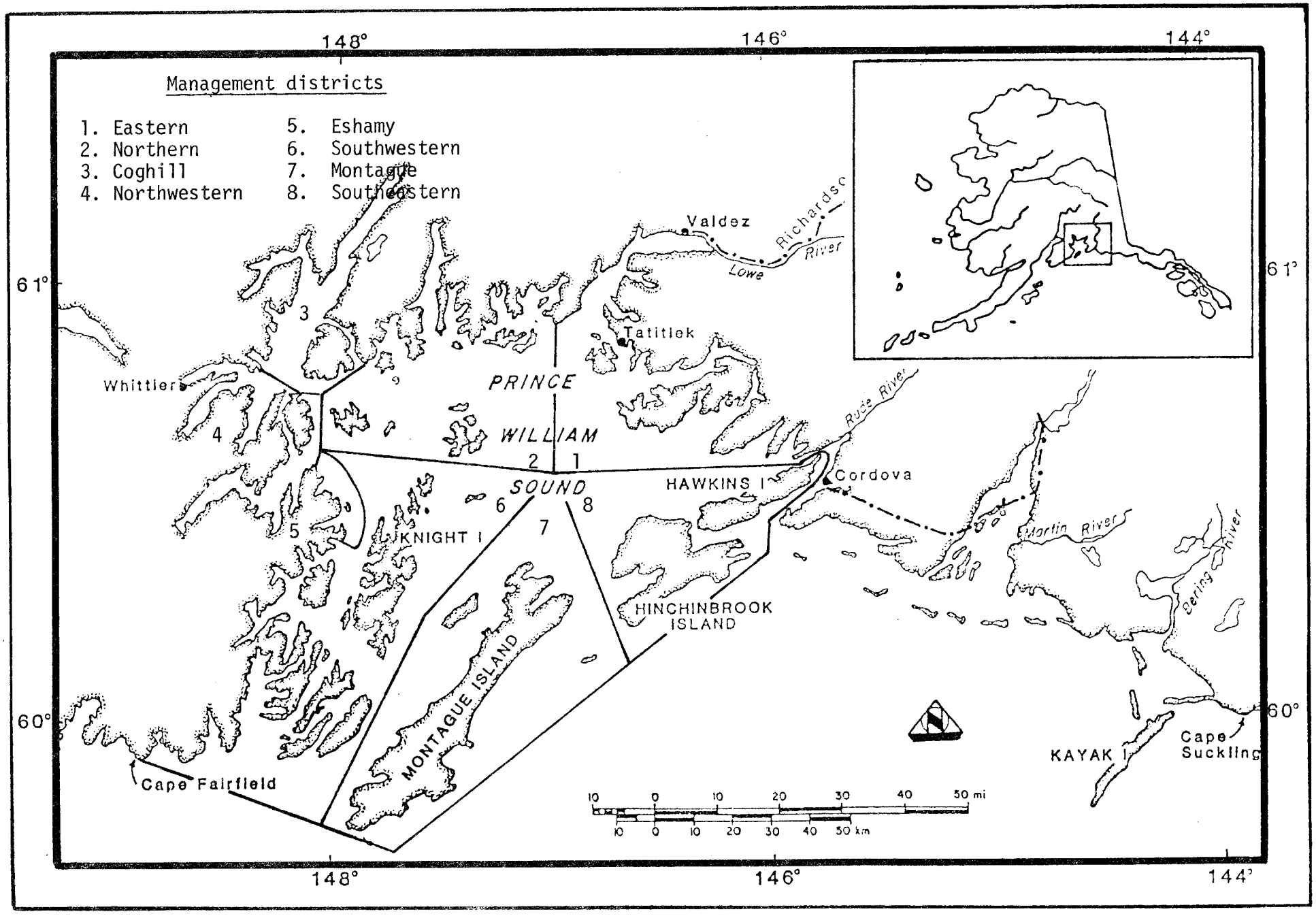

Figure 1. Prince William Sound management area with fishery management districts, 1983.

operations. In addition, FRED Division, PWSAC, VFDA, U.S. Forest Service, and Commercial Fisheries Division weir personnel also conducted ground stream surveys. Additional assistance was also given by members of the sport fishing public. This effort resulted in somewhat more than 200 streams being surveyed at least twice for the presence of tagged salmon. A listing of Prince William Sound salmon streams by district and statistical area is given in ADF&G Technical Data Report No. 81.

All data resulting from this program were recorded in the Prince William Sound salmon computer file for future use in fishery management and modeling studies.

RESULTS

Over the duration of the program, 29 June to 7 August, 16 different sites near the hatcheries involved were used to determine presence of wild and hatchery stocks. By species, 7,684 pink salmon *(O. gorbuscha)*, 1,028 chum salmon *(O. keta)*, 140 sockeye salmon *(O. nerka)*, and 34 coho salmon *(O. kisutch)* were tagged. No chinook salmon *(O. tshawytscha)* were tagged. Tables 1 through 4 shows tagging summaries, by species, tagging site, and date for each of the hatchery sites. Table 5 shows the totals tagged by species.

Tag recovery results for each site and species are presented for each tagging experiment. These results are expressed as percentages of return by district. The percentages are further broken down into catch and individual stream recoveries which represent their respective portions of the total number of recoveries from the experiment involved. The total district figures represent 100% of the recoveries; individual catch and/or stream recoveries do not always add to 100% as a result of rounding. Table 6 through 9 show results of tag recoveries for all the hatchery sites, and Figures 2 through 5 show tagging sites by hatchery.

DISCUSSION

Tagging was not conducted at PWSAC's Port San Juan facility as the local staff felt that sufficient data had been collected during the three previous years of this program. Additionally, the local staff also felt that as much data as possible should be collected on the proposed Esther Island, Main Bay, and Solomon Gulch facilities. This decision was made for the following reasons: (1) The Esther Island facility is located in an area where many of the Sound's salmon stocks occur throughout the season; the proposed hatchery return timing schedule will encompass the entire wild stock return timing spectrum, and (2) the Main Bay and Solomon Gulch facilities were just coming on line in regards to their production potentials and thus were beginning to have an impact on the common property fishery.

Tables 10 and 11 show where Cannery Creek and Main Bay stocks were intercepted. These interceptions were based on stream tag recovery. This type of data presentation will be expanded to all years of the program in the program completion report.

Table 1. Tagging summary for Valdez Fisheries Development Association's Solomon Gulch hatchery, Port Valdez, Prince William Sound, 1983.

Tag site	Date	Species					
		Chinook	Sockeye	Coho	Pink	Chum	Total
20 Mile Beach	8/03	0	3	0	293	38	334
	8/04	0	4	4	96	49	153
	Total	0	7	4	389	87	487
Johnson Cove	6/29	0	0	0	9	0	9
	8/04	0	0	4	173	66	243
	8/06	0	0	0	76	42	118
	Total	0	0	4	258	108	370
Point Lowe	7/01	0	4	0	160	16	180
Jack Bay	6/30	0	5	2	317	68	392
	7/01	0	0	0	175	26	201
	8/05	0	1	7	303	168	479
	8/06	0	0	0	76	132	208
	8/07	0	0	0	100	13	113
	Total	0	6	9	971	407	1393
Port Valdez	7/02	0	1	0	111	16	128
	7/03	0	0	0	169	37	206
	Total	0	1	0	280	53	334
Total		0	18	17	2058	671	2764

Table 2. Tagging summary for Alaska Department of Fish and Game's FRED division Cannery Creek hatchery, Unakwik Inlet, Prince William Sound, 1983.

		Species					
Tag site	Date(s)	Chinook	Sockeye	Coho	Pink	Chum	Total
Kiniklik	7/20	0	2	1	322	17	342
	7/24	0	0	0	314	30	344
	Total	0	2	1	636	47	686
Mueller Cove	7/21	0	0	0	62	4	66
	7/22	0	0	0	368	12	380
	7/23	0	3	1	478	13	495
	Total	0	3	1	908	29	941
Eastside Unakwik Inlet	7/21	0	1	0	196	5	202
Total		0	6	2	1740	81	1829

Table 3. Tagging summary for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983.

		Species					
Tag site	Date(s)	Chinook	Sockeye	Coho	Pink	Chum	Total
Culross Island	7/07	0	4	2	59	42	107
	7/08	0	22	3	145	19	189
	7/10	0	1	0	29	1	31
	7/13	0	11	0	151	25	187
	7/14	0	12	0	401	19	432
	7/16	0	16	1	463	16	496
	7/17	0	4	0	222	11	237
	7/27	0	0	0	209	6	215
	7/28	0	1	0	271	15	287
	Total	0	71	6	1950	154	2181
Esther Light	7/07	0	3	0	56	1	60
	7/15	0	0	1	92	9	102
	Total	0	3	1	148	10	162
Lake Bay	7/07	0	11	1	50	2	64
Hodgkins Pt.	7/15	0	2	1	86	1	90
Southeast Esther Island	7/06	0	10	0	255	2	267
	7/10	0	2	0	14	1	17
	7/15	0	3	1	84	5	93
	Total	0	15	1	353	8	377
Total		0	102	10	2587	175	2874

Table 4. Tagging summary for Alaska Department of Fish and Game's FRED division Main Bay hatchery, Prince William Sound, Alaska, 1983.

Tag site	Date(s)	Species					Total
		Chinook	Sockeye	Coho	Pink	Chum	
Point Nowell	7/31	0	0	0	136	7	143
Crafton Island	7/09	0	10	4	163	37	214
	7/30	0	2	0	833	22	857
	Total	0	12	4	996	59	1071
Nellie Juan Light	7/29	0	2	1	167	35	205
Total		0	14	5	1299	101	1419

Table 5. Tagging summary for all hatcheries, sites and dates, Prince William Sound, 1983.

	Species					
	Chinook	Sockeye	Coho	Pink	Chum	Total
Total	0	140	34	7684	1028	8,886

Overall tag recovery was not as good as hoped for via the commercial fishery. Stream recoveries remained about the same as previous years. A bright spot was the large return of chum salmon; this large return allowed for the tagging of more individuals, thus increasing knowledge via tag recoveries of stocks occurring around the various hatcheries.

As the reader studies the data regarding pink salmon, it will soon become apparent that not only will the area management staff have to manage a particular hatchery for its stocks and wild stocks occurring in the area in question, but will also have to keep in mind that other hatchery stocks are occurring in that particular area at the same time. To what degree this phenomenon occurs in the future and what management problems may arise with pink salmon or other hatchery raised species remains to be seen as the various hatcheries come into full production.

Table 10 does, however, give some indication of the distribution of Cannery Creek stocks. Table 11 shows that, according to tag return data, Main Bay stocks were intercepted only in the immediate vicinity of the hatchery. This type of data will be very useful in years when wild stocks are in low abundance. The problem of stock identification and distribution is bound to increase as the previously mentioned hatchery stock development policy is trending toward terms of season long returns. Currently, existing hatcheries in Prince William Sound have either early and late or late timing only stocks.

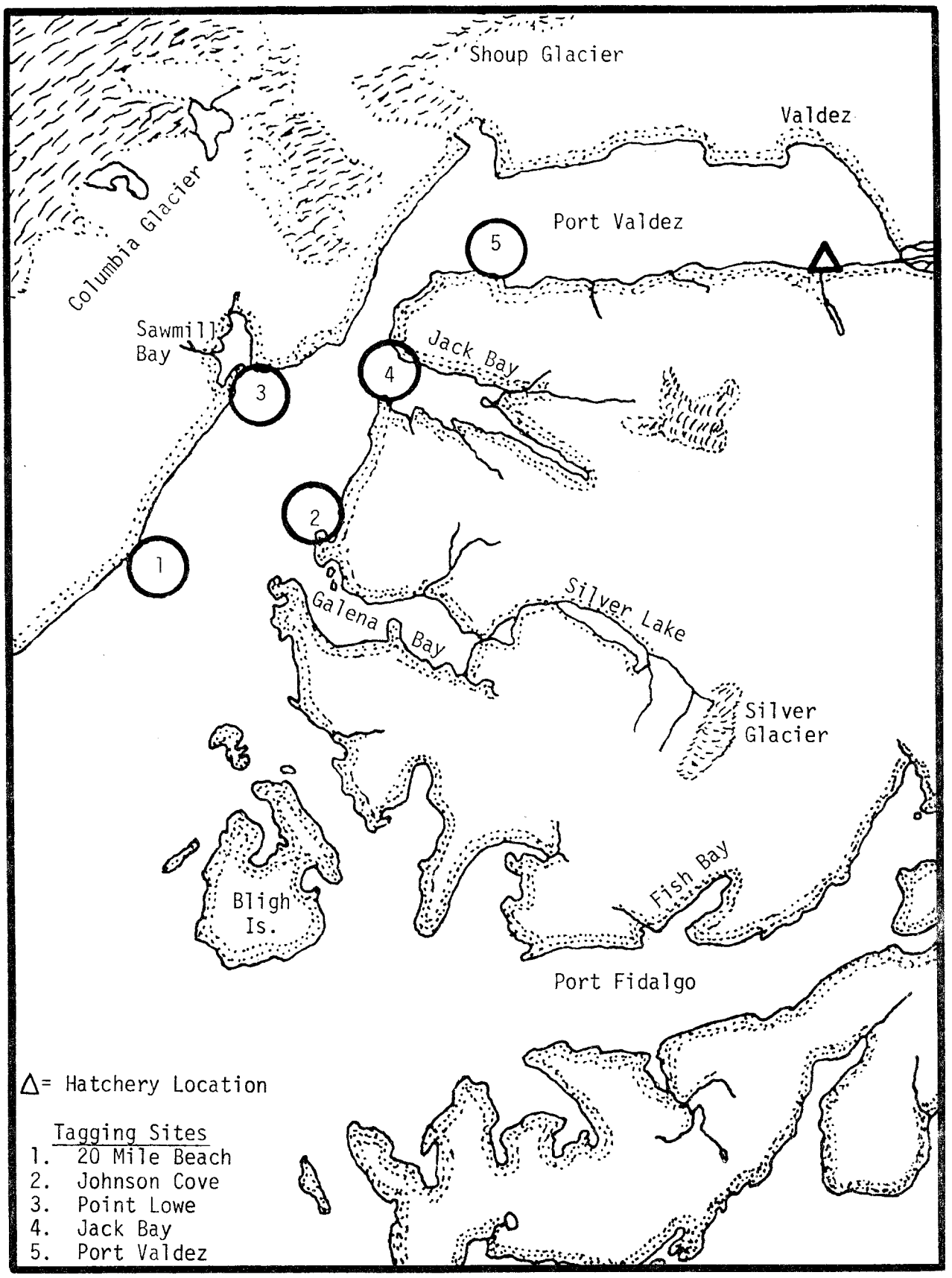

Figure 2. Location of Valdez Fisheries Development Association's Solomon Gulch hatchery and associated tagging sites, Port Valdez, Prince William Sound, Alaska, 1983.

Table 6. Results of tagging experiments in percentage of returns, by species, tagging sites and dates, for the Valdez Fisheries Development Association's Solomon Gulch hatchery, Port Valdez, Prince William Sound, Alaska, 1983.

			Pink Salmon			
		Tagging	Catch		Escapement	
Tag sites		Dates	Area	%	Stream	%
20 Mile Beach		8/ 03				
No. tagged	293					
No. recovered	22					
% recovered	7.5					
District						
Eastern	81.8%		Johnson Cove	50.0	Levshakoff	4.5
			Jack Bay	4.5	Stellar	13.6
			Sawmill Bay	9.1		
Northern	13.6%				Cannery	13.6
Southwestern	5.6%		Bishop Rock	4.5		
		8/04				
No. tagged	96					
No. recovered	8					
% recovered	8.3					
District						
Eastern	75.0%		Johnson Cove	75.0		
Eshamy	12.5%		Main Bay	12.5		
Southeastern	12.5		Hawkins Is.	12.5		
Johnson Cove		6/29				
No. tagged	9					
No. recovered	0					
% recovered	0.0					
		8/04				
No. tagged	173					
No. recovered	43					
% recovered	24.9					
District						
Eastern	95.4		Port Gravina	2.3	Levshakoff	2.3
			Johnson Cove	81.4	Stellar	2.3
			Sawmill Bay	2.3		
			Galena Bay	4.6		
Northern	2.3%				Cannery	2.3
Southwestern	2.3%				Jackson	2.3

-Continued-

Table 6. Results of tagging experiments in percentage of returns, by species, tagging sites and dates, for the Valdez Fisheries Development Association's Solomon Gulch hatchery, Port Valdez, Prince William Sound, Alaska, 1983 (continued).

Tag sites		Tagging Dates	Pink Salmon Catch Area	%	Pink Salmon Escapement Stream	%
		8/06				
No. tagged	76					
No. recovered	5					
% recovered	6.6					
District						
Eastern	100.0%		Port Gravina	20.0	Levshakoff	20.0
			Johnson Cove	20.0	Stellar	20.0
			Sawmill Bay	20.0		
		6/30				
Jack Bay						
No. tagged	317					
No. recovered	33					
% recovered	10.4					
District						
Eastern	97.0%		Solomon Gulch hatchery	57.6	Whalen	3.0
					Lagoon	3.0
			Jack Bay	9.1	Gregorieff	3.0
					Gorge	6.1
					Lowe River	3.0
					Siwash	12.1
Northern	3.0%				Wells	3.0
		7/01				
No. tagged	175					
No. recovered	22					
% recovered	12.6					
District						
Eastern	100.0%		Solomon Gulch hatchery	59.1	Beartrap	4.5
					Levshakoff	4.5
			Jack Bay	4.5	Stellar	4.5
			Port Valdez	4.5	Lowe River	4.5
					Siwash	13.6
		8/05				
No. tagged	303					
No. recovered	41					
% recovered	13.5					

-Continued-

Table 6. Results of tagging experiments in percentage of returns, by species, tagging sites and dates, for the Valdez Fisheries Development Association's Solomon Gulch hatchery, Port Valdez, Prince William Sound, Alaska, 1983 (continued).

			Pink Salmon			
		Tagging	Catch		Escapement	
Tag sites		Dates	Area	%	Stream	%
District						
Eastern	97.6%		Port Gravina	2.4	Gregorieff	9.8
			Port Fidalgo	4.8	Stellar	9.8
			Johnson Cove	65.9		
			Galena Bay	4.8		
Northwestern	2.4%		Shipyard	2.4		
		8/06				
No. tagged	76					
No. recovered	9					
% recovered	11.8					
District						
Eastern	100.0%		Port Fidalgo	11.1	Indian	11.1
			Johnson Cove	11.1	Levshakoff	11.1
			Galena Bay	22.2	Stellar	22.2
			Jack Bay	11.1		
		8/07				
No. tagged	100					
No. recovered	6					
% recovered	6.0					
District						
Eastern	100.0%		Port Fidalgo	16.7	Lagoon	16.7
			Johnson Cove	16.7	Levshakoff	16.7
					Gregorieff	33.4
		7/01				
Point Lowe						
No. tagged	160					
No. recovered	19					
% recovered	11.9					
District						
Eastern	100.0%		Port Valdez	5.3	Gregorieff	10.6
			Solomon Gulch hatchery	63.2	Stellar	5.3
					Siwash	5.3
					Crooked	10.6

-Continued-

Table 6. Results of tagging experiments in percentage of returns, by species, tagging sites and dates, for the Valdez Fisheries Development Association's Solomon Gulch hatchery, Port Valdez, Prince William Sound, Alaska, 1983 (continued).

Pink Salmon

Tag sites		Tagging Dates	Catch Area	Catch %	Escapement Stream	Escapement %
		7/02				
Port Valdez						
No. tagged	111					
No. recovered	17					
% recovered	15.3					
District						
Eastern	100.0%		Port Valdez	5.9	Gregorieff	5.9
			Solomon Gulch		Gorge	17.6
			hatchery	64.7	Siwash	5.9
		7/03				
No. tagged	169					
No. recovered	21					
% recovered	12.4					
District						
Eastern	100.0%		Solomon Gulch		Gorge	23.8
			hatchery	66.7	Siwash	9.5

Chum Salmon

Tag sites		Tagging Dates	Catch Area	Catch %	Escapement Stream	Escapement %
		8/03				
20 Mile Beach						
No. tagged	38					
No. recovered	3					
% recovered	7.9					
District						
Eastern	100.0%		Sawmill Bay	33.3	Sunny	33.3
					Stellar	33.3
		8/04				
No. tagged	49					
No. recovered	3					
% recovered	6.1					
District						
Eastern	66.7%		Sawmill Bay	33.3	Stellar	33.3
Northern	33.3%				Cannery	33.3

-Continued-

Table 6. Results of tagging experiments in percentage of returns, by species, tagging sites and dates, for the Valdez Fisheries Development Association's Solomon Gulch hatchery, Port Valdez, Prince William Sound, Alaska, 1983 (continued).

Tag sites		Tagging Dates	Pink Salmon Catch Area	%	Escapement Stream	%
		8/04				
Johnson Cove						
No. tagged	66					
No. recovered	7					
% recovered	10.6					
District						
Eastern	100.0%		Johnson Cove	85.7		
			Port Fidalgo	14.3		
		8/06				
No. tagged	42					
No. recovered	3					
% recovered	7.1					
District						
Eastern	100.0%		Port Gravina	33.3		
			Johnson Cove	33.3		
			Sawmill Bay	33.3		
		6/30				
Jack Bay						
No. tagged	68					
No. recovered	7					
% recovered	10.3					
District						
Eastern	71.5%		Port Fidalgo	14.3	Shale	14.3
					Gregorieff	14.3
					Levshakoff	14.3
					Stellar	14.3
Northern	28.5%				Wells	14.3
					Cannery	14.3
		7/01				
No. tagged	26					
No. recovered	5					
% recovered	19.2					
District						
Eastern	100.0%		Solomon Gulch hatchery	40.0	Fish	20.0
					Gregorieff	20.0
					Stellar	20.0

-Continued-

Table 6. Results of tagging experiments in percentage of returns, by species, tagging sites and dates, for the Valdez Fisheries Development Association's Solomon Gulch hatchery, Port Valdez, Prince William Sound, Alaska, 1983 (continued).

			Pink Salmon			
Tag sites		Tagging Dates	Catch Area	Catch %	Escapement Stream	Escapement %
		8/05				
No. tagged	168					
No. recovered	8					
% recovered	4.8					
District						
Eastern	87.5%		Port Fidalgo	37.5	Lagoon	12.5
			Johnson Cove	25.0		
			Port Valdez	12.5		
Southeastern	12.5%		Hawkins Is.	12.5		
		8/06				
No. tagged	132					
No. recovered	5					
% recovered	3.8					
District						
Eastern	100.0%		Port Fidalgo	40.0		
			Johnson Cove	20.0		
			Jack Bay	20.0		
			Sawmill Bay	20.0		
		8/07				
No. tagged	13					
No. recovered	1					
% recovered	7.7					
District						
Eastern	100.0%		Galena Bay	100.0		
		7/01				
Point Lowe						
No. tagged	16					
No. recovered	3					
% recovered	18.8					
District						
Eastern	100.0%				Stellar	100.0

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Table 6. Results of tagging experiments in percentage of returns, by species, tagging sites and dates, for the Valdez Fisheries Development Association's Solomon Gulch hatchery, Port Valdez, Prince William Sound, Alaska, 1983 (continued).

Tag sites		Tagging Dates	Pink Salmon Catch Area	%	Pink Salmon Escapement Stream	%
Port Valdez		7/03				
No. tagged	37					
No. recovered	7					
% recovered	18.9					
District						
Eastern	100.0%		Solomon Gulch hatchery	14.3	Gorge	57.1
					Crooked	14.3
					Stellar	14.3

Tag sites		Tagging Dates	Sockeye Salmon Catch Area	%	Sockeye Salmon Escapement Stream	%
		8/04				
20 Mile Beach						
No. tagged	4					
No. recovered	1					
% recovered	25.0					
District						
Northern	100.0%		Cannery Creek hatchery harvest area	100.0		
		7/01				
Point Lowe						
No. tagged	4					
No. recovered	2					
% recovered	50.0					
District						
Eastern	50.0%		Solomon Gulch hatchery	50.0		
Coghill	50.0%				Coghill River	50.0

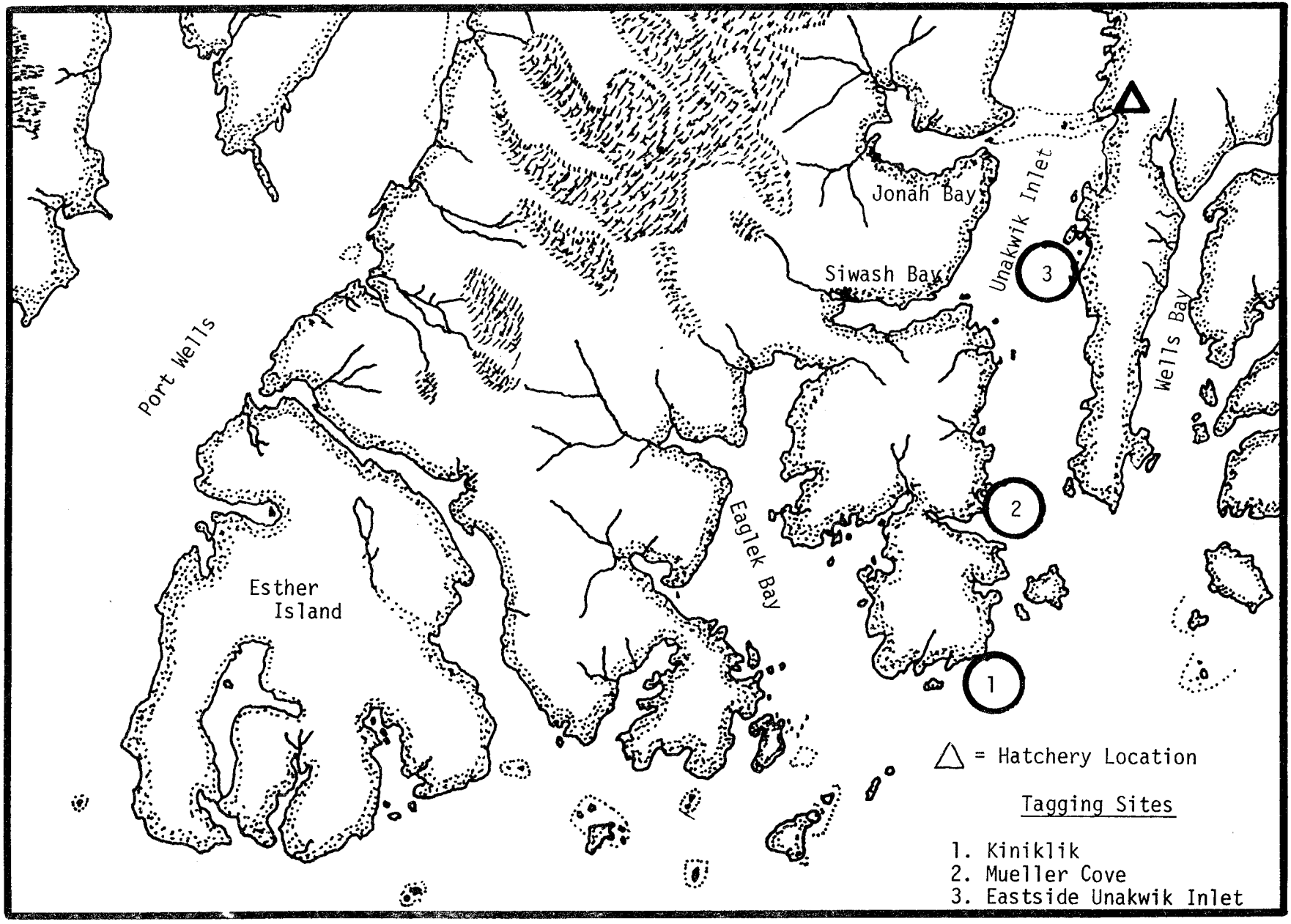

Figure 3. Location of Alaska Department of Fish and Game's FRED division Cannery Creek hatchery and associated tagging sites, Prince William Sound, 1983.

Table 7. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Alaska Department of Fish and Game's F.R.E.D. division Cannery Creek hatchery, Unakwik Inlet, Prince William Sound, Alaska, 1983.

Tag sites		Tagging Dates	Pink Salmon Catch Area	%	Pink Salmon Escapement Stream	%
Kiniklik		7/20				
No. tagged	322					
No. recovered	46					
% recovered	14.3					
District						
Northern	87.0%		Long Bay	2.2	Wells River	6.5
			Granite Bay	8.7	Siwash	6.5
			Kiniklik	17.4	Miners	2.2
			Mueller Cove	21.7		
			Siwash Bay	2.2		
			Jonah Bay	4.3		
			Mid Unakwik Inlet	6.5		
			Cannery Creek hatchery harvest area	6.5		
Coghill	13.0%		Esther Is.	6.5	Coghill River	2.2
			Westside Port Wells	4.3		
		7/24				
No. tagged	314					
No. recovered	70					
% recovered	22.3					
District						
Northern	98.6%		Granite Bay	1.4	Backyard	1.4
			Kiniklik	20.0	Cannery	5.7
			Mueller Cove	8.6	Jonah	4.3
			Jonah Bay	8.6	Siwash	10.0
			Mid Unakwik Inlet	5.7	Unakwik	1.4
			Cannery Creek hatchery harvest area	31.4		
Coghill	1.4%		Esther Is.	1.4		
Mueller Cove		7/21				
No. tagged	62					
No. recovered	15					
% recovered	24.2					

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Table 7. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Alaska Department of Fish and Game's F.R.E.D. division Cannery Creek hatchery, Unakwik Inlet, Prince William Sound, Alaska, 1983 (continued).

Tag sites		Tagging Dates	Pink Salmon Catch Area	%	Pink Salmon Escapement Stream	%
District						
Northern	100.0%		Kiniklik	6.7	Granite	13.3
			Mueller Cove	26.7	Siwash	13.3
			Siwash Bay	6.7	Jonah	13.3
			Jonah Bay	6.7		
			Cannery Creek hatchery harvest area	13.3		
		7/22				
No. tagged	368					
No. recovered	73					
% recovered	19.8					
District						
Northern	98.6		Unakwik Point	1.4	Spring	1.4
			Kiniklik	11.0	Granite	1.4
			Mueller Cove	8.2	Siwash	9.6
			Jonah Bay	16.4	Unakwik	2.7
			Mid Unakwik Inlet	5.5		
			Cannery Creek hatchery harvest area	27.4		
Northwestern	1.4%				McClure	1.4
		7/23				
No. tagged	478					
No. recovered	92					
% recovered	19.2					
District						
Northern	98.9%		Kiniklik	17.4	Wells	1.1
			Mueller Cove	9.8	Cannery	5.4
			Siwash Bay	2.2	Siwash	5.4
			Jonah Bay	14.1	Jonah	4.3
			Mid Unakwik Inlet	12.0		
			Cannery Creek hatchery harvest area	27.2		

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Table 7. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Alaska Department of Fish and Game's F.R.E.D. division Cannery Creek hatchery, Unakwik Inlet, Prince William Sound, Alaska, 1983 (continued).

			Pink Salmon			
		Tagging	Catch		Escapement	
Tag sites		Dates	Area	%	Stream	%
Coghill	1.1%		Esther Island	1.1		
East Unakwik Inlet		7/21				
No. tagged	196					
No. recovered	36					
% recovered	18.4					
District						
Northern	97.2%		Fairmont Is.	2.8	Backyard	2.8
			Granite Bay	5.6	Cedar	2.8
			Wells Bay	2.8	Surplus	2.8
			Kiniklik	22.2	Wells	2.8
			Jonah Bay	5.6	Jonah	2.8
			Mid Unakwik Inlet	8.3		
			Cannery Creek hatchery harvest area	19.4		
			Mueller Cove	16.7		
Coghill	2.8%		Westside Port Wells	2.8		

			Chum Salmon			
		Tagging	Catch		Escapement	
Tag sites		Dates	Area	%	Stream	%
Kiniklik		7/20				
No. tagged	17					
No. recovered	1					
% recovered	5.9					
District						
Northern	100.0%				Siwash	100.0
Kiniklik		7/24				
No. tagged	30					
No. recovered	5					
% recovered	16.7					
District						
Northern	100.0%		Granite Pt	20.0	Cedar	20.0
			Cannery Creek hatchery harvest area	60.0		

-Continued-

Table 7. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Alaska Department of Fish and Game's F.R.E.D. division Cannery Creek hatchery, Unakwik Inlet, Prince William Sound, Alaska, 1983 (continued).

Chum Salmon

Tag sites		Tagging Dates	Catch Area	Catch %	Escapement Stream	Escapement %
Mueller Cove		7/21				
No. tagged	4					
No. recovered	1					
% recovered	25.0					
District						
Coghill	100.0%				Coghill River	100.0
		7/22				
No. tagged	12					
No. recovered	2					
% recovered	16.7					
District						
Northern	100.0%		Jonah Bay	50.0		
			Cannery Creek hatchery harvest area	50.0		
		7/23				
No. Tagged	13					
No. recovered	4					
% recovered	30.8					
District						
Northern	100.0%		Mueller Cove	25.0	Siwash	25.0
			Cannery Creek hatchery harvest area	50.0		

Sockeye Salmon

Tag sites		Tagging Dates	Catch Area	Catch %	Escapement Stream	Escapement %
Eastside Unakwik Inlet		7/21				
No. tagged	1					
No. recovered	1					
% recovered	100.0					
District	100.0%		Cannery Creek hatchery harvest area	100.0		

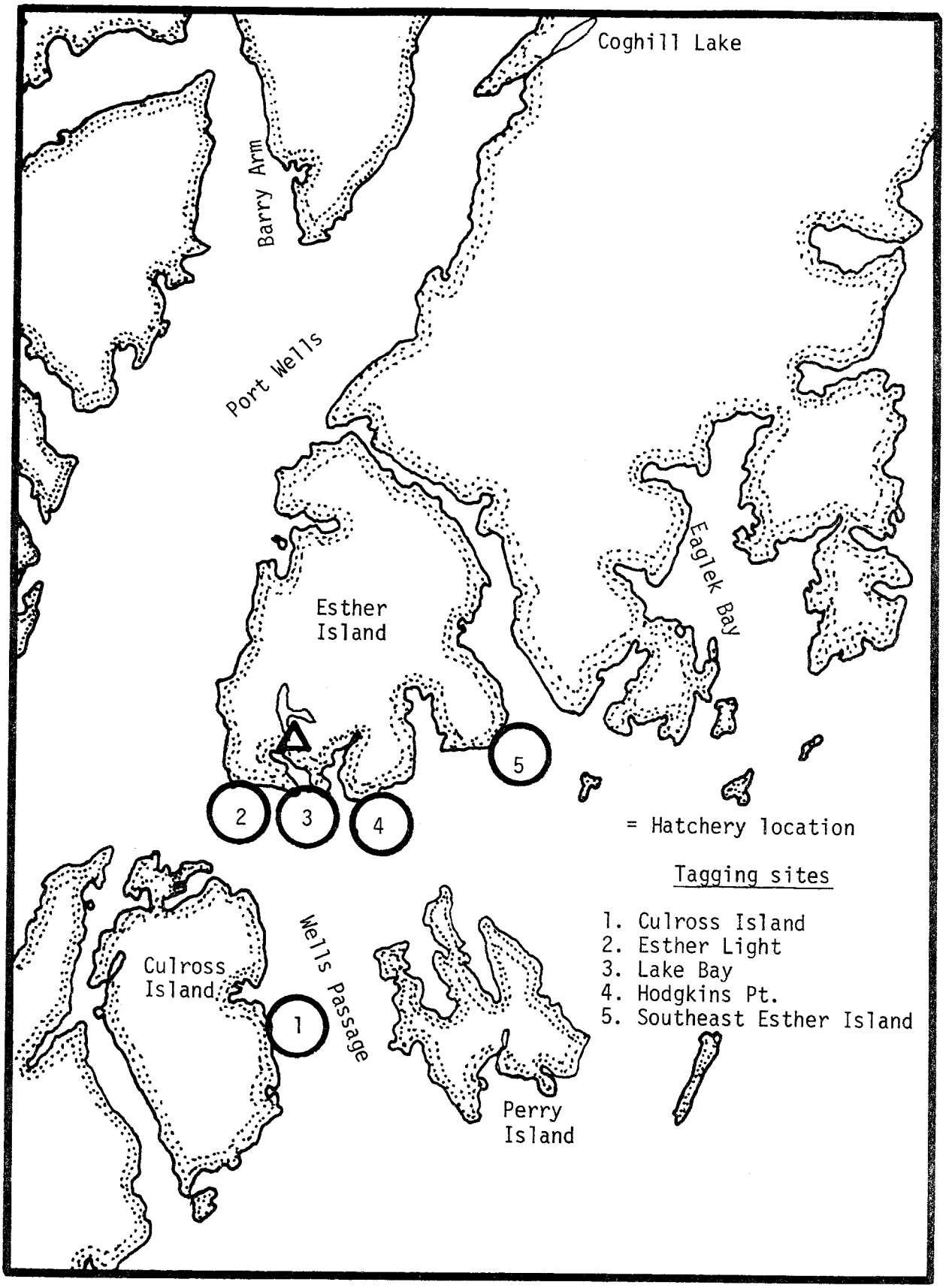

Figure 4. Location of proposed Prince William Sound Aquaculture Corporation's Esther Island hatchery and associated tagging sites, Prince William Sound, Alaska, 1983.

Table 8. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983.

Tag sites		Tagging Dates	Pink Salmon Catch Area	%	Escapement Stream	%
Culross Island		7/07				
No. tagged	59					
No. recovered	13					
% recovered	22.0					
District						
Coghill	76.9%		Esther Is.	7.7	Coghill River	53.8
					Meacham	15.4
Northwestern	23.1%		Culross Is.	7.7	Logging Camp	7.7
					Paulson	7.7
		7/08				
No. tagged	145					
No. recovered	34					
% recovered	23.4					
District						
Northern	2.9%		Unakwik Pt.	2.9		
Coghill	79.4%				Coghill River	73.5
					Swanson	5.9
Northwestern	17.6%				Logging Camp	2.9
					Tebenkof	2.9
					Paulson	2.9
					Wickett	2.9
					Mink	2.9
					McClure	2.9
		7/10				
No. tagged	29					
No. recovered	2					
% recovered	6.9					
District						
Coghill	100.0%				Coghill River	100.0
		7/13				
No. tagged	151					
No. recovered	39					
% recovered	258					
District						
Coghill	82.1 %				Coghill River	79.5
					Meacham	2.6
Northwestern	17.9%		Culross Pass.	2.6	Logging Camp	7.7
					Culross	5.1
					Mink	2.6

-Continued-

Table 8. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983 (continued).

Tag sites		Tagging Dates	Pink Salmon Catch Area	%	Pink Salmon Escapement Stream	%
		7/14				
No. tagged	401					
No. recovered	84					
% recovered	20.9					
District						
Northern	1.2%		Mueller Cove	1.2		
Coghill	71.4%		Esther Is.	11.9	Coghill River	47.6
			West side of Port Wells	2.4	Swanson	8.3
					Meacham	1.2
Northwestern	23.8%		Shipyard	1.2	Logging Camp	2.4
					Paulson	1.2
					Wickett	3.6
					Culross	1.2
					Mink	4.8
Eshamy	3.6%		Main Bay	2.4	Elishansky	1.2
		7/16				
No. tagged	463					
No. recovered	86					
% recovered	18.6					
District						
Northern	2.4%		Unakwik Pt.	1.2		
			Jonah Bay	1.2		
Coghill	75.6%		Esther Is.	8.1	Coghill River	53.5
			West side Port Wells	5.8	Pirate	2.3
					Meacham	1.2
					Swanson	4.7
Northwestern	22.0%		Culross Is.	1.2	Logging Camp	2.3
			Shipyard	4.7	Tebenkof	2.3
			Port Nellie Juan	1.2	Paulson	2.3
					Wickett	3.5
					Mink	3.5

-Continued-

Table 8. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983 (continued).

Tag sites		Tagging Dates	Pink Salmon Catch Area	%	Escapement Stream	%
		7/17				
No. tagged	222					
No. recovered	33					
% recovered	14.9					
District						
Northern	6.0%		Kiniklik	3.0		
			Mueller Cove	3.0		
Coghill	84.8%		Esther Is.	12.1	Coghill River	66.7
			Westside Port Wells	6.0		
Northwestern	9.2%				Logging Camp	3.0
					Paulson	6.0
		7/27				
No. tagged	209					
No. recovered	24					
% recovered	11.5					
District						
Northern	12.5%		Kiniklik	8.3		
			MidUnakwik Inlet	4.2		
Coghill	8.4%		Esther Is.	4.2	Swanson	4.2
Northwestern	54.1%		Culross Is.	8.3	Paulson	12.5
			Culross Pass.	12.5	Wickett	4.2
			Shipyard	4.2	Culross	4.2
					Mink	8.3
Eshamy	20.8%		Main Bay	20.8		
Southwestern	4.2%		Chenega Is.	4.2		
		7/28				
No. tagged	271					
No. recovered	32					
% recovered	11.8					
District						
Coghill	9.4%		Esther Is.	9.4		
Northwestern	46.8%		Culross Pass.	3.1	Culross	3.1
			Shipyard	37.5	Chimevisky	3.1
Eshamy	37.5%		Main Bay	37.5		
Southwestern	6.3%		Chenega Is.	6.3		

-Continued-

Table 8. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983 (continued).

			Pink Salmon			
		Tagging	Catch		Escapement	
Tag sites		Dates	Area	%	Stream	%
Esther Light		7/07				
No. tagged	56					
No. recovered	11					
% recovered	19.6					
District						
Eastern	9.1%				Levshakoff	9.1
Northern	27.2%				Wells	18.2
					Cannery	9.1
Coghill	54.6%		Esther Is.	9.1	Coghill River	45.5
Southwestern	9.1%		Bainbridge Pass.	9.1		
		7/15				
No. tagged	92					
No. recovered	10					
% recovered	10.9					
District						
Northern	50.0%		Kniklik	30.0	Cannery	10.0
			Cannery Creek hatchery harvest area	10.0		
Coghill	50.0%		Esther Is.	20.0	Coghill River	20.0
			Westside Port Wells	10.0		
Lake Bay		7/07				
No. tagged	50					
No. recovered	10					
% recovered	20.0					
District						
Northern	10.0%		Jonah Bay	10.0		
Coghill	80.0%		Esther Is.	20.0	Coghill River	40.0
			Westside Port Wells	10.0	Meacham	10.0
Northwestern	10.0%				Paulson	10.0
Hodgkins Pt.		7/15				
No. tagged	86					
No. recovered	9					
% recovered	10.5					

-Continued-

Table 8. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983 (continued).

			Pink Salmon			
			Catch		Escapement	
Tag sites		Tagging Dates	Area	%	Stream	%
District						
Northern	22.2%		Kiniklik	11.1		
			Mueller Cove	11.1		
Coghill	77.8%		Esther Is.	22.2	Coghill River	33.3
			Westside Port Wells	11.1	Swanson	11.1
Southeast Esther Island		7/06				
No. tagged	255					
No. recovered	37					
% recovered	14.5					
District						
Eastern	18.9%		Port Valdez	2.7	Lagoon	2.7
					Donaldson	2.7
					Levshakoff	2.7
					Gregorieff	2.7
					Gorge	2.7
					Crooked	2.7
Northern	62.2%		Jonah Bay	2.7	Benchmark	2.7
			Wells Bay	2.7	Wells River	48.6
					Jonah	5.4
Coghill	16.2%		Esther Is.	8.1	Coghill River	5.4
			Westside Port Wells	2.7		
Northwestern	2.7%		Culross Is.	2.7		
		7/10				
No. tagged	14					
No. recovered	4					
% recovered	28.6					
District						
Northern	75.0%		Jonah Bay	25.0	Wells River	50.0
Coghill	25.0%				Coghill River	25.0
		7/15				
No. tagged	84					
No. recovered	14					
% recovered	16.7					

-Continued-

Table 8. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983 (continued).

Tag sites		Tagging Dates	Pink Salmon Catch Area	Catch %	Escapement Stream	Escapement %
District						
Northern	64.3%		Wells Bay	7.1	Wells River	21.4
			Unakwik Pt.	7.1	Cannery	7.1
			Jonah Bay	21.4		
Coghill	35.7%		Esther Is.	7.1	Coghill River	21.4
			Westside Port Wells	7.1		

Tag sites		Tagging Dates	Chum Salmon Catch Area	Catch %	Escapement Stream	Escapement %
Culross Island		7/07				
No. tagged	42					
No. recovered	7					
% recovered	16.7					
District						
Coghill	85.7%		Esther Is.	42.9	Mill	14.3
			Westside Port Wells	28.6		
Northwestern	14.3%		Culross Pass.	14.3		
		7/08				
No. tagged	19					
No. recovered	2					
% recovered	10.5					
District						
Coghill	50.0%				Coghill River	50.0
Northwestern	50.0%				Paulson	50.0
		7/10				
No. tagged	1					
No. recovered	0					
% recovered	0.0					
		7/13				
No. tagged	25					
No. recovered	6					
% recovered	24.0					

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Table 8. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983 (continued).

			Chum Salmon			
Tag sites		Tagging Dates	Catch Area	%	Escapement Stream	%
District						
Coghill	50.0%		Esther Is.	16.7	Mill	16.7
					Swanson	16.7
Northwestern	50.0%		Port Nellie Juan	33.3	Paulson	16.7
		7/14				
No. tagged	19					
No. recovered	3					
% recovered	15.8					
District						
Coghill	66.6%		Esther Is.	33.3	Coghill River	33.3
Northwestern	33.3%		Culross Is.	33.3		
		7/16				
No. tagged	16					
No. recovered	3					
% recovered	18.8					
District						
Northern	33.3%		Kiniklik	33.3		
Coghill	33.3%				Coghill River	33.3
Northwestern	33.3%				Paulson	33.3
		7/17				
No. tagged	11					
No. recovered	2					
% recovered	18.2					
District						
Coghill	50.0%		Esther Is.	50.0		
Northwestern	50.0%				Tebenkof	50.0
		7/27				
No. tagged	6					
No. recovered	2					
% recovered	33.3					

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Table 8. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983 (continued).

			Chum Salmon			
		Tagging	Chum		Escapement	
Tag sites		Dates	Area	%	Stream	%
District						
Coghill	50.0%		Esther Is.	50.0		
Eshamy	50.0%		Main Bay	50.0		
		7/28				
No. tagged	15					
No. recovered	3					
% recovered	20.0					
District						
Northern	33.3%		Long Bay	33.3		
Coghill	33.3%		Esther Is.	33.3		
Northwestern	33.3%				Culross	33.3
Esther Light		7/07				
No. tagged	15					
No. recovered	1					
% recovered	6.7					
District						
Coghill	100.0%				Meacham	100.0
Southeast Esther Island		7/10				
No. tagged	1					
No. recovered	1					
% recovered	100.0					
District						
Northern	100.0%				Spring	100.0

			Sockeye Salmon			
		Tagging	Catch		Escapement	
Tag sites		Dates	Area	%	Stream	%
Culross Island		7/07				
No. tagged	4					
No. recovered	1					
% recovered	25.0					

-Continued-

Table 8. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983 (continued).

			Sockeye Salmon			
		Tagging	Catch		Escapement	
Tag sites		Dates	Area	%	Stream	%
District						
Coghill	100.0%				Coghill River	100.0
		7/08				
No. tagged	22					
No. recovered	12					
% recovered	54.5					
District						
Coghill	100.0%				Coghill River	100.0
		7/10				
No. tagged	1					
No. recovered	1					
% recovered	100.0					
District						
Coghill	100.0%				Coghill River	100.0
		7/13				
No. tagged	11					
No. recovered	6					
% recovered	54.5					
District						
Coghill	100.0%				Coghill River	100.0
		7/14				
No. tagged	12					
No. recovered	3					
% recovered	25.0					
District						
Coghill	100.0%				Coghill River	100.0
		7/16				
No. tagged	16					
No. recovered	5					
% recovered	31.3					
District						
Coghill	100.0%				Coghill River	100.0

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Table 8. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983 (continued).

Tag sites		Tagging Dates	Sockeye Salmon Catch Area	%	Escapement Stream	%
		7/17				
No. tagged	4					
No. recovered	3					
% recovered	75.0					
District						
Coghill	100.0%		Esther Is.	66.7	Coghill River	33.3
Esther Light		7/07				
No. tagged	3					
No. recovered	0					
% recovered	0.00					
Lake Bay		7/07				
No. tagged	11					
No. recovered	1					
% recovered	9.1					
District						
Coghill	100.0%				Coghill River	100.0
		7/15				
Hodgkins Pt.						
No. tagged	2					
No. recovered	1					
% recovered	50.0					
District						
Coghill	100.0%				Coghill River	100.0
Southeast Esther Island		7/06				
No. tagged	10					
No. recovered	2					
% recovered	20.0					
District						
Northern	100.0%		Mueller Cave	50.0		
			Cannery Creek hatchery harvest area	50.0		

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Table 8. Results of tagging experiments in percentage of returns by species, tagging sites and dates, for Prince William Sound Aquaculture Corporation's proposed Esther Island hatchery, Prince William Sound, Alaska, 1983(continued).

Tag sites		Tagging Dates	Sockeye Salmon Catch Area	%	Escapement Stream	%
		7/10				
No. tagged	2					
No. recovered	1					
% recovered	50.0					
District						
Coghill	100.0%				Coghill River	100.0
		7/15				
No. tagged	3					
No. recovered	2					
% recovered	66.7					
District						
Coghill	100.0%				Coghill River	100.0

Tag sites		Tagging Dates	Coho Salmon Catch Area	%	Escapement Stream	%
Southeast Esther Island		7/15				
No. tagged	1					
No. recovered	1					
% recovered	100.0					
District						
Coghill	100.0%		Esther Is.	100.0		

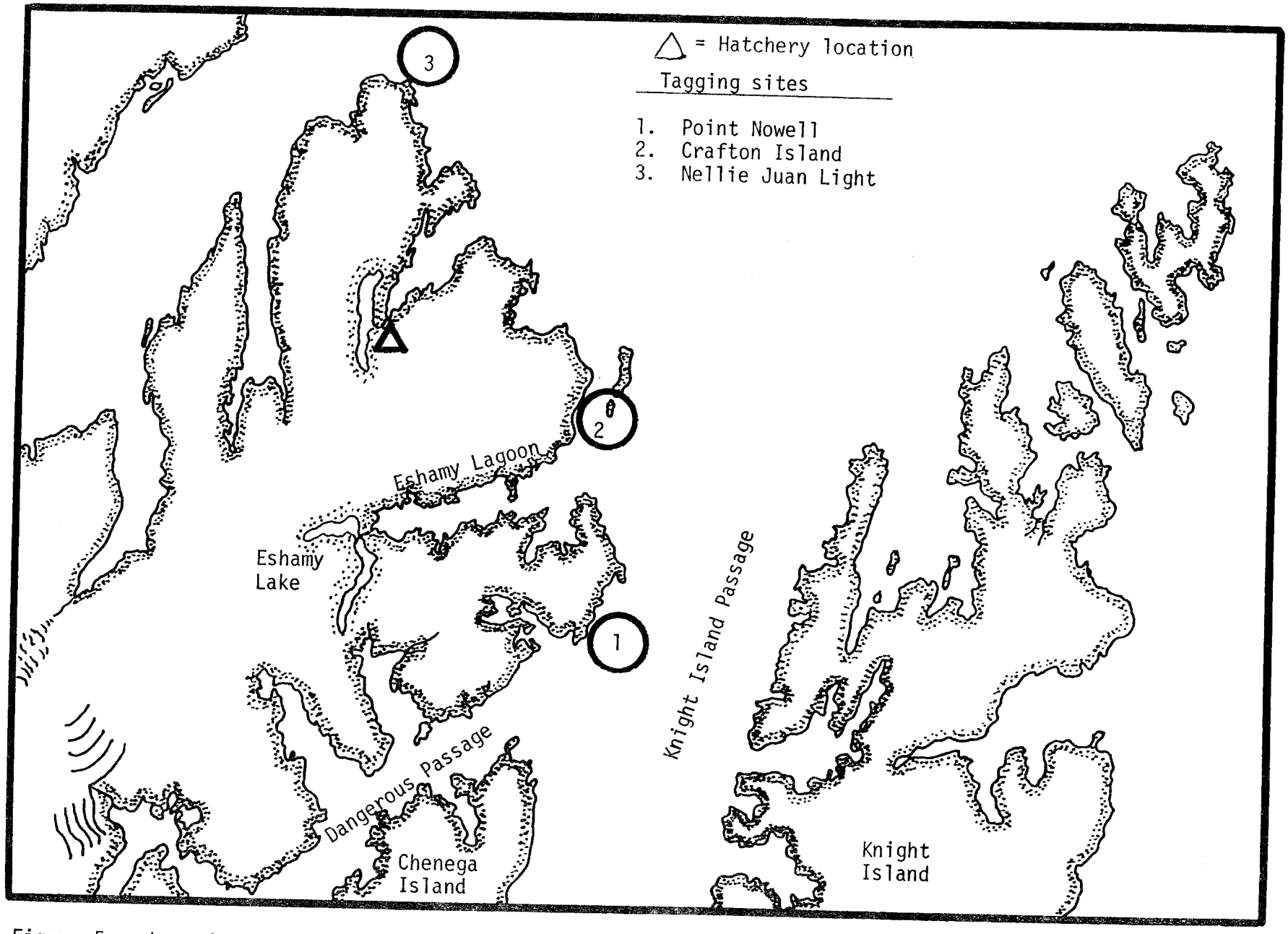

Figure 5. Location of Alaska Department of Fish and Game's FRED division Main Bay hatchery and associated tagging sites, Prince William Sound, 1983.

Table 9. Results of tagging experiments, in percentage of returns, by species, tagging sites and dates, for Alaska Department of Fish and Game's Main Bay hatchery, Prince William Sound, Alaska, 1983.

			Pink Salmon			
		Tagging	Catch		Escapement	
Tag sites		Dates	Area	%	Stream	%
Point Nowell		7/31				
No. tagged	136					
No. recovered	13					
% recovered	9.6					
District						
Northern	7.6%		Kiniklik	7.6		
Eshamy	61.6%		Main Bay	30.8	Main River	30.8
Southwestern	30.8%		Chenega Is.	30.8		
Crafton Island		7/09				
No. tagged	163					
No. recovered	27					
% recovered	16.6					
District						
Coghill	37.0%		Esther Is.	3.7	Coghill River	25.9
			West side Port Wells	7.4		
Northwestern	33.3%		Culross Is.	11.1	Culross	14.8
			Shipyard	3.7	Mink	3.7
Eshamy	14.8%		Main Bay	3.7	Loomis	3.7
					Solf	3.7
					Elishansky	3.7
Southwestern	11.1%				Erb	3.7
					Kompkoff	3.7
					Falls	3.7
Montague	3.7%		Rocky Bay	3.7		
		7/30				
No. tagged	833					
No. recovered	106					
% recovered	12.7					
District						
Northern	1.9%		Jonah Bay	0.9		
			Perry Is.	0.9		
Coghill	0.9%		Esther Is.	0.9		
Northwestern	6.6%		Shipyard	4.7	Tebenkof	0.9
					Mink	0.9

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Table 9. Results of tagging experiments, in percentage of returns, by species, tagging sites and dates, for Alaska Department of Fish and Game's Main Bay hatchery, Prince William Sound, Alaska, 1983 (continued).

			Pink Salmon			
Tag sites		Tagging Dates	Catch Area	%	Escapement Stream	%
Eshamy	67.8%		Main Bay	19.8	Main River	16.0
					Loomis	28.3
					Gumboot	0.9
					Eshamy River	2.8
Southwestern	22.6%		Chenega Is.	12.4	Erb	1.9
			Snug Harbor	0.9	Brizgaloff	0.9
			Shelter Bay	1.8	Johnson	1.9
			Prince of Wales Passage	0.9	Calvert	0.9
			Bishop Rock	0.9		
Nellie Juan Light		7/29				
No. tagged	167					
No. recovered	43					
% recovered	25.7					
District						
Northern	7.0%		Kiniklik	2.3		
			Mid Unakwik Inlet	4.6		
Eshamy	7.0%		West side of Port Wells	2.3	Chasm	4.6
Northwestern	11.6%		Shipyard	4.6	Logging Camp	2.3
					Mink	4.6
Eshamy	60.4%		Main Bay	48.8	Main River	9.3
					Eshamy River	2.3
Southwestern	14.0%		Chenega Is.	4.6	Jackson	2.3
			Prince of Wales Passage	4.6		
			Shelter Bay	2.3		

-Continued-

Table 9. Results of tagging experiments, in percentage of returns, by species, tagging sites and dates, for Alaska Department of Fish and Game's Main Bay hatchery, Prince William Sound, Alaska, 1983 (continued).

			Chum Salmon			
		Tagging	Catch		Escapement	
Tag sites		Dates	Area	%	Stream	%
Crafton Island		7/09				
No. tagged	37					
No. recovered	0					
% recovered	0.0					
		7/30				
No. tagged	22					
No. recovered	3					
% recovered	13.6					
District						
Coghill	33.3%		Esther Is.	33.3		
Eshamy	66.7%		Main Bay	33.3	Loomis	33.3
Nellie Juan Light		7/29				
No. tagged	35					
No. recovered	3					
% recovered	8.6					
District						
Northwestern	33.3%				Chimevisky	33.3
Eshamy	66.7%		Main Bay	66.7		

			Sockeye Salmon			
		Tagging	Catch		Escapement	
Tag sites		Dates	Area	%	Stream	%
Crafton Island		7/09				
No. tagged	10					
No. recovered	3					
% recovered	33.3					
District						
Coghill	100.0%				Coghill River	100.0

-Continued-

Table 9. Results of tagging experiments, in percentage of returns, by species, tagging sites and dates, for Alaska Department of Fish and Game's Main Bay hatchery, Prince William Sound, Alaska, 1983 (continued).

			Coho Salmon			
Tag sites		Tagging Dates	Catch		Escapement	
			Area	%	Stream	%
Crafton Island		7/09				
No. tagged	4					
No. recovered	1					
% recovered	25.0					
District						
Northwestern	100.0%		Shipyard	100.0		

Table 10. Summary of Cannery Creek pink salmon hatchery stock interceptions, based on stream recoveries of tagged fish in Cannery Creek, by tag site and date, Prince William Sound, Alaska, 1983.

Tagging site	Dated tagged	Number of fish tagged	Number of fish recovered
Esther Light	7/07	56	1
Esther Light	7/15	92	1
S.E. Esther Island	7/15	84	1
Mueller Cove	7/23	478	5
Kiniklik	7/24	314	4
20 Mile Beach	8/03	293	3
20 Mile Beach	8/04	96	2
Johnson Cove	8/04	174	1
Total		1,587	18

Table 11. Summary of Main Bay pink salmon hatchery stock interceptions, based on stream recoveries of tagged fish in Main River, by tag site and date, Prince William Sound, Alaska, 1983.

Tagging site	Date tagged	Number of fish tagged	Number of fish recovered
Nellie Juan Light	7/29	167	4
Crafton Island	7/30	833	17
Point Nowell	7/31	136	4
Total		1,136	25

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